

# MODELING THE BEHAVIOR OF THE MULTIPLIER IN TOURISM INVESTMENT MULTIPLIER

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## ABSTRACT

*In scientific approaches, the concept of the tourism investment multiplier highlights the role of organizational activities built on spatial economies in the competitiveness dynamics of tourist destinations. However, the concept of investment multiplier, as proposed by Keynes (1936), comes from industrial economics. Thus, this article consists in showing that the simple transfer of a scientific tool such as the multiplier coefficient can be enriched to understand the dynamics of the investment multiplier effect in tourism development and to acquire more operational efficiency in the field of tourism and the characteristics of tourism activities.*

**Keyword:** *Tourism, economy, investment multiplier, multiplier coefficient.*

## 1. INTRODUCTION

As one of the fastest growing sectors of the global economy, the tourism industry has significant economic, socio-cultural and environmental impacts. Tourism contributes significantly to the well-being of communities through strategic planning based on the tourism multiplier or revenue multiplier effect.

In order to exist, the tourism activity itself generates a series of orders and purchases of goods and services from other economic sectors, such as construction (for accommodation facilities), public works (for infrastructure and superstructure), information technology (for the management of tourism businesses), agriculture (to feed visitors), crafts and cultural industries (for souvenirs and shows), etc.

The purpose of any measurement is to provide accurate and usable information about the phenomenon being measured. However, it turns out that measurement in tourism is still an unresolved difficulty. The integral measurement of tourism therefore implies addressing a series of aspects that a strictly economic vision could not consider. Today, economic studies of tourism deal with the specifications of the sector in relation to the national economy. Tourism is at the origin of an economic chain that stimulates many economic sectors through the growth of consumption that occurs seasonally or annually, as the case may be. This phenomenon is called "the multiplier effect of tourism", the principle of which is based on the study of the path of expenditures related to the tourist activity.

## 2. THE MULTIPLIER EFFECT OF TOURISM APPROACH

When a destination is developed for tourism, the geographic shift in spending has a significant effect on both the local and national economy. Indeed, the traveler who moves outside of his or her region, for business or vacation, will have to allocate expenses for necessities and activities during the stay. Among the most common necessities are lodging (in all its forms), food, beverages, international or local intercity transportation (air, train, car, bus, boat, etc.). In addition, there may be expenses for various activities: visits to museums, amusement parks, games (e.g., casino), sports activities and sports centers, entertainment (bars, discotheques, shows, etc.), souvenirs, gasoline, basic necessities, etc. Hence, traveler-tourist expenditures constitute significant revenues that benefit the

economic development of businesses, the family income of workers (either directly or indirectly), job creation and, finally, governments (taxation in all its forms).



**Fig -1: The eight employment sectors in tourism architecture**

All of these foreign currency inflows into the local and national economy contribute directly to the country's balance of payments (creating a balance between the income derived from tourist spending and the economic costs necessary to provide the various services). If we start with the generic definition of TOURISM:

$$T = D + H + R + A/L + A - S$$

With : T = Tourism

D = Travel, transport

H = Accommodation

R = Food and beverage

A/L = Activity / leisure

A - S = Other services (insurance, reservations, etc.)

Thus, all the economic activities of tourism are part of a specific production system, that of services or service provision. In this respect, the receipts of international tourism are like those from payments made in foreign currency by foreign visitors for their tourist consumption expenditure, i.e. tourist goods and services. Similarly, expenditures are the expenditures on the consumption of tourist goods and services made abroad by national visitors of the country in which the expenditures are evaluated. Thus, initially, we consider tourism expenditures related to characteristic activities (stores, commerce, etc.); tourism businesses

- import products and pay taxes, which represents leakage for the country;
- buy products from non-tourist businesses in the region;
- pay wages and generate profits or savings.

So, only a part of the production is re-injected, more or less rapidly, into the economic circuit; the rest (savings, taxes, spending abroad or on imported products) represents important leakages for countries dependent on foreign goods, capital and labor.

## 2.1 The Concept of Investment Multiplier in the Economy

Keynes (1936) discusses the investment multiplier as: "Let us call k, the investment multiplier. It tells us that when there is an increase in investment, income will increase by an amount which is k times the increase in investment. More generally, according to this author, the multiplier (k) indicates that when an increase in aggregate

demand occurs (investment, consumption, government spending or exports), income increases by an amount equal to  $k$  times the increase in demand.

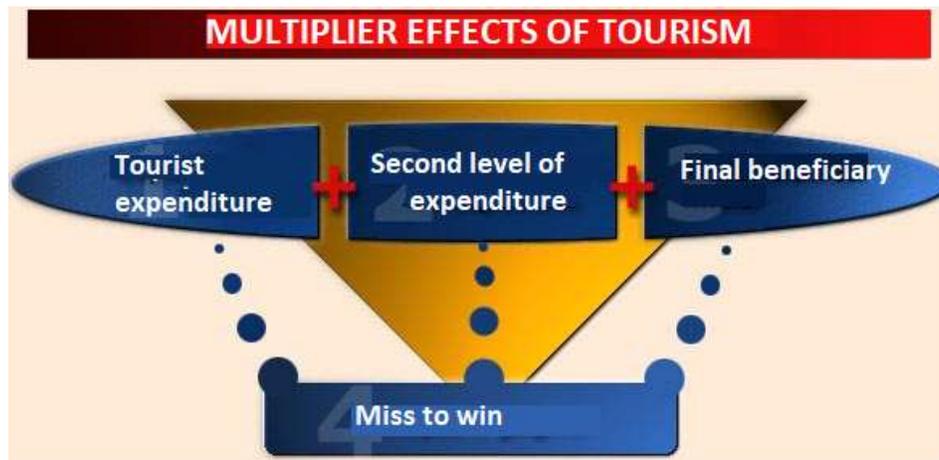


Fig -2: Tourism multiplier effects configuration

There is a priori, no low or high limit to the coefficient. Its amount depends on the spread of spending within the economy, which can be stopped by at least three phenomena: saving, spending with firms located outside the country, and the payment of wages to non-residents. Thus, to simplify, the coefficient is close to 0 if, for example, the investment is made by a single firm outside the territory employing foreign personnel and consuming foreign products. At the other extreme, an investment made entirely by local firms using local materials and personnel will have a high multiplier effect. However, while the notion of a multiplier effect is obvious, the calculation of the coefficient for measuring this effect is much less so.

The multiplier effect, on the other hand, is based on the principle that all spending, whether by households, firms or public authorities, is spread among the various economic agents in the territory. Thus, public spending benefits not only the companies that respond directly to orders from the state and local authorities, but also indirectly the suppliers of these companies and their employees, who in turn consume, continuing the circulation of the initial spending. This circulation of expenditure in the economic system is possible because agents are interdependent and the expenditure of some forms the income of others.

## 2.2 The attribute of the coefficient in the multiplier effect

KEYNES (1936) points out that the multiplier effect of an investment is different from one region to another. Consequently, his estimate calls for the use of a coefficient specific to that region and not a national coefficient, which would be unsatisfactory. Indeed, the notion of multiplier effect is very much linked to the question of the marginal propensity to consume and also to the marginal propensity to consume locally produced goods. The higher the marginal propensity to consume locally produced goods, the higher the multiplier coefficient. Thus, this propensity is a function of the size of the reference territory and its economic structure, because the smaller the territorial scale, the smaller the productive apparatus, and the less able it is to respond to the diversity of demand. This propensity is therefore a function of the size of the reference territory and its economic structure. Thus, the smaller the reference territory, the lower the propensity to consume locally produced goods.

If the purpose of using a multiplier coefficient is to measure the total economic effect of an additional expenditure for a territory as a whole, i.e., the path of this expenditure between the various actors in the economy, it is not possible to use the same coefficient for different expenditures. Indeed, an expenditure resulting from the creation of a soap production plant cannot have the same consequences as those induced by the construction of a museum where tourists flock. To simplify, the soap factory will employ several hundred local workers but will buy machine tools made in France, for example; while the tourists who visit the museum will eat locally produced food in restaurants, and so on.

### 3. THE RANDOM EVENT

For developing countries, tourism is seen by many as an engine of economic growth and job creation, foreign exchange earnings needed to cover imports, tax revenues, and new opportunities for business creation. It should be noted that over a given period, the coincidence in a destination of a high level of competitiveness and a drop in tourist spending (and vice versa) is quite possible, as tourist spending is a cyclical phenomenon which generates, depending on the economic situation, sometimes an increase in tourist receipts, sometimes a decrease. As a result, this cyclical movement is likely to influence the productivity of the sector and therefore its development.

#### 3.1 Mathematical Modeling of the Investment Multiplier Effect

If we start with the generic definition of TOURISM, where:  $T = D + H + R + A/L + A - S$   
 With:  $T =$  Tourism  
 $D =$  Travel, transport  
 $H =$  Accommodation  
 $R =$  Food and beverage  
 $A/L =$  Activity/leisure  
 $A - S =$  Other services (insurance, reservation, etc.)

So, all the economic activities of Tourism are part of a specific production system, that of services. And, the purpose of any measurement is to provide accurate and usable information on the phenomenon being measured. However, it turns out that measurement in tourism is still an unresolved difficulty. The integral measurement of tourism therefore implies addressing a series of aspects that a strictly economic vision could not consider. Today, economic studies of tourism deal with the specifications of the sector in relation to the national economy. In addition to the analysis of the income and expenditure of international tourism, the most common measurement indexes are the tourism multiplier or revenue multiplier effect. More generally, an increase in consumption corresponds to an increase in the investment needed to increase production and then income. The equilibrium between uses and resources is defined by the equations:  $Y + M = C + G + I + X$

Where:  $Y =$  Total value of goods and services produced by domestic economic agents  
 $M =$  Imports  
 $C =$  Government consumption  
 $I =$  Capital formation or investment  
 $G =$  represents public consumption and investment  
 $X =$  Export

Moreover, the consumption function during the study period is given by the formula:  $C = C_o + cY_d$   
 Where:  $C_o$  is called autonomous consumption that does not depend on national income  
 $Y_d$  is the national disposable income, i.e. deducted from taxes  
 $c$  is the marginal propensity to consume. It measures the effect of a variation in national income on the consumption expenditure of economic agents.

Here, the value of consumption is:  $C = C_o + cY$   
 Indeed, data on disposable income are very difficult to obtain. Furthermore, we assume that the level of exports is independent of the level of national income but depends on external income. It will also be assumed that government consumption is independent of national income.

Hence, the import function is given by the formula:  $M = M_o + mY$   
 Where  $M_o$  is the autonomous import that does not depend on national income  
 $m$  is the marginal propensity to import, which measures the effect of a variation in national income on imports.

And, the investment function is given by the formula:  $I = I_o + aY - ei$   
 Where:  $I_o$  is autonomous investment,  
 $a$  is the marginal propensity to invest, which measures the effect on investment demand of a variation in national income;  
 $e$  is the interest sensitivity  
 $i$  is the interest rate

Indeed, the income  $Y$  has a positive influence, while the interest rate has a negative influence since it represents the financing cost of the investment. Moreover, since the objective is to determine the value of the tourism investment multiplier, national investment will be divided into tourism investment ( $I_t$ ) and non-tourism investment ( $I_{nt}$ ) and will be decomposed into :  $I = I_t + I_{nt}$

Hence the equation becomes:  $I = I_t + I_{nt} = I_{ot} + a_t Y + I_{ont} + a_{nt} Y - e' i$

Where:  $a_t$ : marginal propensity to invest in tourism

$a_{nt}$  : marginal propensity to invest in non-tourism

$e' i = e_t i + e_{nt} i$  : interest sensitivity of tourism and non-tourism investments

It will be assumed that the level of the country's exports does not depend on national income but depends on external income, since it represents external demand. It will also be assumed that public consumption is independent of national income. Exports and consumption are therefore considered as exogenous variables. Finally, the resource-employment equilibrium is written:

$$Y1 + (M_o + mY1) = (C_o + cY1) (I_{ot} + a_t Y1) + (I_{ont} + a_{nt} Y1) + G_o + X_o - e' i$$

$$Y1 = C_o + cY1 + I_{ot} + a_t Y1 + I_{ont} + a_{nt} Y1 + G_o + X_o - M_o - mY1 - e' i$$

As a result of the change in tourism investment, which increases by a total amount of  $\Delta I_t$ , a new balance is established between aggregate supply and aggregate demand:

$$Y2 = C_o + cY2 + I_{ot} + \Delta I_t + a_{nt} Y2 + G_o + X_o - M_o - mY2 - e' i$$

The change in revenue ( $\Delta Y = Y2 - Y1$ ) that results from the initial change in tourism investment are equal to:

$$\Delta Y = Y2 - Y1 = c(Y2 - Y1) + \Delta I_t + a_t (Y2 - Y1) + a_{nt} (Y2 - Y1) - m (Y2 - Y1)$$

$$\Delta Y = c\Delta Y + \Delta I_t + a_t \Delta Y + a_{nt} \Delta Y - m\Delta Y$$

$$\Delta Y (1 - c - a_t - a_{nt} + m) = \Delta I_t$$

The tourism investment multiplier measures the effect of a change in tourism investment on the level of national income, that is:

$$K = \frac{\Delta y}{\Delta I_{ot}}$$

Then the equation gives:  $K = 1 / (1 - c - a_t - a_{nt} + m)$

The import ratio is assumed to be constant for all successive transactions. By simplifying the mathematical calculation, the value of the revenue multiplier will be 3 using the following formula:

$$K = 1 / 1 - c$$

Where:  $c = C/R$  is the marginal propensity to consume.

The income multiplier, as defined and calculated in this example, is often considered to express the true tourism multiplier effect (sometimes called the revenue multiplier). It is called the income multiplier of an initial value added, and it determines the relationship between the increase in national income and the primary increase in that income which itself results from the initial increase in tourism spending. Similarly, specific multipliers are defined for production, sales (or transactions) and even employment, the latter measuring the increase in the level of employment due to an increase in tourism spending.

### 3.2 Simulation in the Process of the Investment Multiplier Effect

By deduction : Measuring the relationship between these increases leads to the concept of the multiplier. For example: This represents an increase in tourism consumption of US\$100 per year. We assume 25% leakage due to direct imports (investments for tourism superstructures, alcohol, labor, etc.) and indirect imports (imports needed for local non-tourism production). The remaining 3/4 is the value added (direct and indirect) to tourism goods and services by local labor, capital, land and profits. It is also assumed that this \$75 is entirely reinjected into the economic circuit, which is spent in full : 1/3 destined for imports (leakage), 2/3 to local consumption.

The increase in national income ( $R$ ) resulting from an initial increase ( $C$ ) = \$100 in tourism spending will therefore be:  $(R) = 75 + 50 + 33.33 + 22.22 + 14.81 + \dots \# 225$ . Its corresponding to  $(R) = 75 + 2/3 (75) + 2/3 [2/3 (75)] + \dots \# 225$  or 3 times the primary increase of \$75.

Finally, two multiplier coefficients have been applied to the total expenditure incurred. The first is the impact of all demand on tourism businesses, which corresponds to the corresponding turnover multiplied by a coefficient of 1.94 (this coefficient has been estimated on the basis of other similar studies). For every dollar spent with local businesses, it is assumed that 0.94 will be spent with other local businesses. With this coefficient alone, the direct impact is already almost doubled.

Next, a second coefficient, which we will call the income multiplier, is used. From the same amount of the impact of the demand addressed to the companies, it has been considered that 45% is devoted by them to the payment of wages. To the corresponding wage bill, the analysis applied a new multiplier coefficient of 2.857. This means that for each dollar paid by a company to its employee, an additional \$1.857 will be spent in the economy. If the initial direct impact is \$12,176 million, the total effect is \$33,798 million. For this study, not taking into account the multiplier effect means that almost two-thirds of the economic impact is forgotten. So, this study used a last coefficient to estimate the number of jobs generated by the total amount of direct spending in the economy. This coefficient of 0.000065 is multiplied by the \$12,176,656 spent in the economy to obtain 791 additional jobs. In summary, if the tourism multiplier is equal to 1.15 (in this case the multiplier), this means that one million dollars of tourism spending generates a total of \$1,150,000 of additional income in the economy, which is the one million from the original spending and the additional \$150,000 from the multiplier effect.

#### 4. CONCLUSIONS

In summary, this paper has sought to explore the empirical links between the multiplier effect and tourism, and has attempted to analyze the extent to which economic growth does or does not respond to changes in tourism activity. Tourism activities create jobs and generate purchases of goods and services with the development of a multiplier effect. The estimation of this effect has led to the fact that the measurement of the multiplier effect using a coefficient, even if it is regional or sectoral, is very delicate. The use of a regional or sectoral coefficient implies that the multiplier effect of the expenditure, within this sector, is homogeneous. However, we have shown that technical characteristics can have an important influence on the multiplier effect of the investment expenditure required to carry it out, and that consequently the sector, given its technical characteristics, has its own multiplier coefficient. Assessing the multiplier effect therefore requires a thorough examination of the path of the expenditure through the economic circuit.

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